First of a Series on

PLANT ADVENTURERS

PLANT ADVENTURERS-INTRODUCTION

by

MIRIAM WOOD

Raymond Foundation

Museum Stories, Number 210

March 3, 1951

Plant Adventurers

Everyone likes adventures. They take us away from the things that we have to do every day and they are usually fun. It's an adventure to go on a picnic or to the zoo, unless you do it every day.

It's even an adventure to go to school for the first few days, and then you get used to going and it seems commonplace. An adventure is doing something different.

We usually think of an adventurer as a person who travels far and has had exciting and even dangerous things happen to him. We realize that animals have adventures too. The day your pet dog got into a fight with a skunk and came home smelling like a skunk—that was a painful adventure for him.

Seldom does anyone think of plants as having adventures. Plants seem so quiet as they grow in the warm sunshine. We like to rest in the cool shade of a tree in the summertime. But as we look up into the branches and see the green leaves spread out to catch the sunshine, we don't think of trees as adventurers. They just don't seem to

be doing anything. And yet plants are adventurers and they are doing many things. Usually they are working so quietly that you hardly know what's going on, but they are really alive and growing and moving.

Some plants even move fast enough for us to see them move. In fact some almost jump at us. If you touch the midrib of a leaf of the sensitive plant (Mimosa), the leaf closes right up and droops downward for protection. Plants also travel around. They become adventurers as they fly, walk, swim, float, roll, shoot, and hitch rides on animals and people and even trains. Plants are engineers. They build bridges and islands. Have you swung across a stream on a vine or walked across a river on a fallen tree trunk? Or have you ever stepped on a bog island made by plants? Water plants grow together, and their roots and stems become matted. First thing you know there is a little island made of plants. It may not be anchored at first, but as it gets bigger it becomes stationary.

Some plants could be called villains because they cause suffering and even death. Poison ivy may look harmless to you but, if you are sensitive to it, beware. It is dangerous. Other plants are fighters. They fight for their food and their very lives. They push each other around and kill each other off as they try to take all the food and water and sunshine. Many plants could be called heroes because they are so useful to us. They manufacture food for us. In fact the green plants are the only forms of life that can manufacture food and harness the energy from the sunshine. Without them we could not live. Some plants are life-savers because they have properties that will make us well when we are sick.

Can you now believe that plants are really alive and moving and doing things and that we can call them adventurers? In the following eight stories you will read about plant travelers, fighters, pioneers, and heroes. They are great adventurers.

This page is for your own notes and illustrations

Second of a Series on

PLANT ADVENTURERS

PLANT TOURISTS

by

MARIE SVOBODA

Raymond Foundation

Museum Stories, Number 211

March 10, 1951

Plant Tourists

Did you know that some plants, like people, travel? Well, they do, except that they don't travel exactly as people travel. Plants that move about from place to place might be called plant tourists.

One plant tourist that even city boys and girls know well is the milkweed. The milkweed is a flyer. It is seen often about Chicago, growing in fields and waste places. It travels about in two ways. It may creep along by extending its underground rootstock or it may fly to another place. Milkweed seeds fly because they have fine silky parachutes. You can see the fluffy parachutes floating about during the fall. Each milkweed seed pod contains hundreds of tiny, flat, brown seeds. When the seed pod is ripe, it bursts, and the little seeds and their white parachutes are carried by the winds far and wide over the countryside. Man has made good use of the floss in the milkweed parachutes. Milkweed floss is so light and buoyant that it can be used in life-preserver belts.

The tulip is a walker. It is a plant that loves sunshine and, if it is planted in a shady corner of a garden, the tulip will soon "walk" to a sunnier spot. The bulb from which the tulip grows doesn't really move, though. What it actually does is to send out a small shoot that grows underground, sometimes for a distance of several inches. In a little while a small swelling starts close to the tip of the shoot, and as more food material enters it from the original bulb, the swelling grows and takes on the shape of a tulip bulb. All that is left finally of the original bulb is the outer wrapping of brown tissue.

The jewelweed is a jumper. This plant, which grows best in damp, shady places, has an even more suitable name. It is also called the touch-me-not because of the way in which it gets rid of its seeds. The seeds are housed in small striped pods. When the seeds are

ready to start new plants, the least jar will cause the pods to burst and hurl their seeds for several feet in every direction.

The witch hazel is another jumper. It is a plant that blossoms in the fall, and its bright yellow flowers add a touch of vivid color to the already glowing landscape. This plant stores its seeds in miniature cannons. When the seeds are ripe, the little seed cups shoot the seeds many feet away.

The western tumbleweed is a tumbler. The dry tumbleweed looks like a ball. When the wind blows, the root breaks, and the plant goes bumbling along, blown hither and yon to scatter its little fruits over the countryside.

The coconut palm of the tropics is a swimmer. The coconut has a light waterproof covering. Even after floating in salt water for some time, it can sprout into a new plant. This probably accounts for its being found on most tropical coasts. The rare double coconut, the largest nut in the world, is called "coco de mer," coconut of the sea, because of its remarkable resistance to the effects of water.

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Third of a Series on

PLANT ADVENTURERS

PLANT HOBOES

by

MARIE SVOBODA

Raymond Foundation

Museum Stories, Number 212

March 17, 1951

Plant Hoboes

Some plants can't travel by themselves. They can't roll around like the tumbleweed, scatter their seeds like the milkweed, or float to a safe place to start growing like the coconut. Let's call these plants that must hitch a ride hoboes.

Many weed seeds could be called hoboes, and some of them have very clever ways of getting free rides to new places where they can grow. For example, some weeds produce seeds that have claws or grappling hooks that fasten onto objects or animals. Other weeds have sticky seeds that cling to the claws and beaks of birds and so are carried great distances.

Certainly the most bothersome plant pests are those hoboes that are carried from one place to another by people and animals. A pest of this kind is the sturdy burdock, a plant that sends down a long, strong taproot with which it anchors itself in the ground.

The burdock bears many fruits. They are green balls that are covered with spiny hooks. Because they are so well protected, the seeds inside the balls have plenty of time to develop and get ready to start out on their travels. Burdock seeds are lucky if they be-

come attached to the tail of a horse or a cow. Not only does the animal move about but it also thrashes its tail continuously and shakes out the seeds as it lumbers along. And, as if that weren't enough, the animal's trampling occasionally plants the seeds. The burdock is indeed a real hobo. It gets a free ride and, besides that, it sometimes gets a free planting through no effort of its own.

Sometimes man himself without realizing it carries a plant to a new spot. Nearly every one of us at one time or another has had to stop on a hike to pick burs from our stockings and trousers or skirts. When we throw the burs away, we are helping to spread those plant hoboes over the countryside.

Some plant hoboes, like the mistletoe, hitch a ride on birds. The mistletoe never grows on the ground. It is always found on the trunks or branches of trees, from which it gets part of its food supply. The tiny yellow blossoms of the mistletoe develop into small, waxy, white berries. Birds find the berries tasty and eat them. Some of the berries, however, cling to the birds' claws and feathers and, as the birds fly, the berries fall off, perhaps miles away from the parent plant, and begin to grow. Other plant hoboes whose seeds are carried by birds are blackberries, grapes, currants, and cherries.

Some plants, just like some people, do not seem content to stay in one place. They aren't even satisfied with moving to another field. They really want to travel. This is true especially of some grasses and clovers that cover great distances in railroad cars or steamships. Sometimes these plant hoboes travel to parts of the country or even to foreign lands where they have never been known or seen before. When railroad cars or steamships are cleaned, the seeds are dumped out along with the rest of the rubbish. Then the seeds start to grow, perhaps thousands of miles away from their original homes.

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Fourth of a Series on

PLANT ADVENTURERS

PLANT PARTY-GIVERS

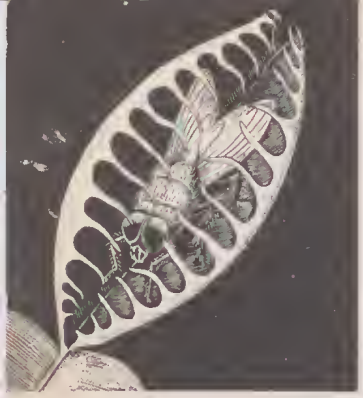
by

MIRIAM WOOD

Raymond Foundation

Museum Stories, Number 213

March 24, 1951



Venus flytrap

Plant Party-Givers

Some plant adventurers are go-getters while others sit back and wait for the adventures to come to them. Some even go so far as to invite guests to a party and then kill them when they come. These plants entice insects into their flowers or leaves and then trap them there to use for food. The pitcher plant is this kind of party-giver. It has leaves that naturally collect water from the rainfall or from the dew because they are shaped like pitchers. There is a sweet substance around the mouth of the pitcher and this is the lure for the insects.

The insects stop and enter the mouth of the pitcher to enjoy a bit of this sweet stuff. Sometimes in their hurry or awkwardness in getting at it they tumble down into the pitcher. There they thrash about helplessly. They cannot fly out because their wings are wet, and they cannot crawl out because there is a circle of little hairs pointing downward around the mouth of the pitcher. Finally the insect guests die, and their bodies are absorbed by the plant as food.

The Venus flytrap and the sundew are two other plant party-givers that attract insects into their leaves and then eat them. The Venus flytrap has the most wonderful trap of all. It is a little end-section of the leaf. Here there is often some sweet substance, and insects, even quite large beetles, may be tempted to stop for a taste of it.

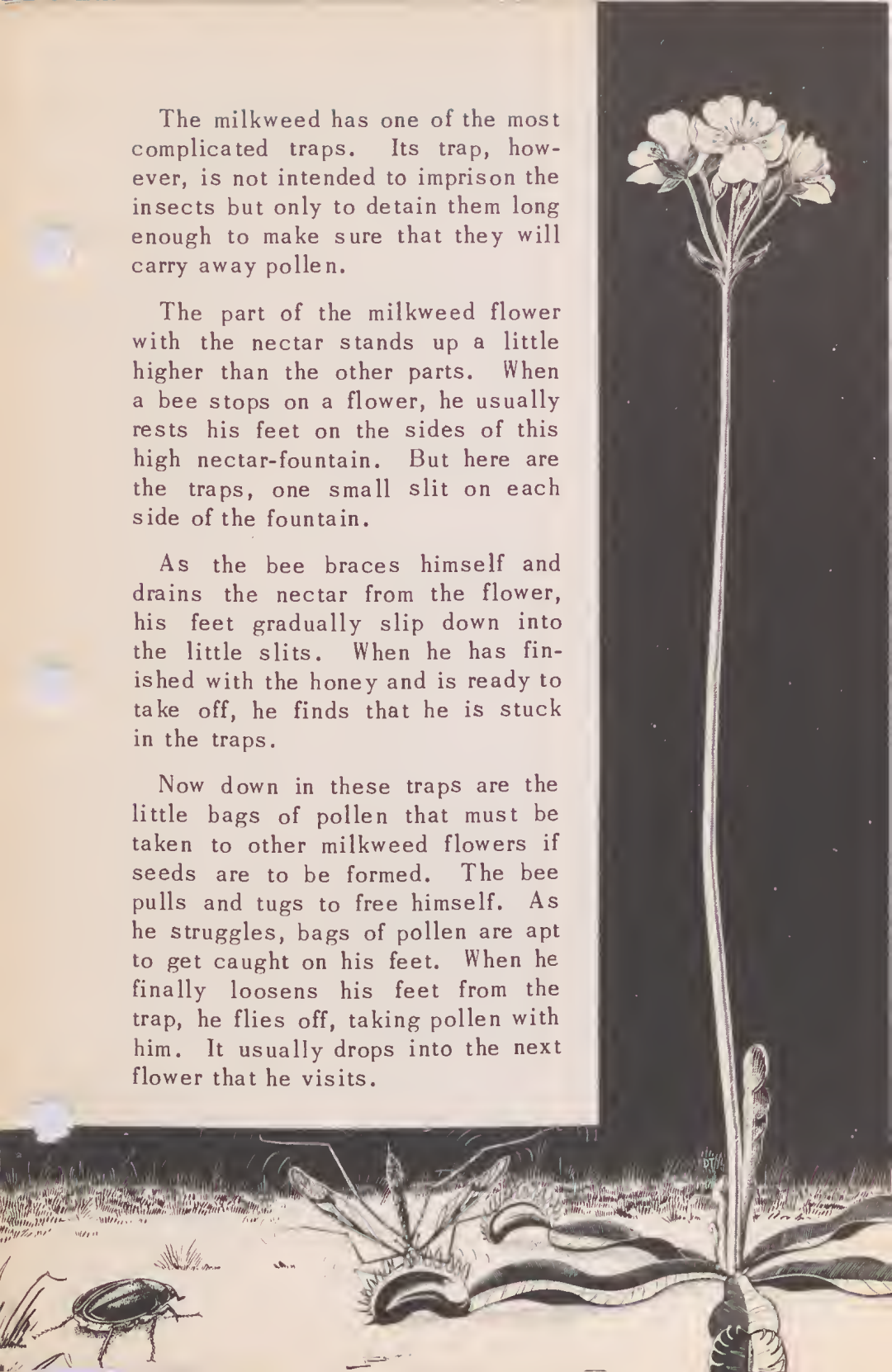
But danger lurks there. The trap is equipped with sensitive hairs that act like triggers. The instant the visitor touches the hair triggers, the leaf snaps shut. Then spines on the edges of the leaf hold the victim completely entrapped, and eventually he is digested by the plant as its food.

The milkweed has one of the most complicated traps. Its trap, however, is not intended to imprison the insects but only to detain them long enough to make sure that they will carry away pollen.

The part of the milkweed flower with the nectar stands up a little higher than the other parts. When a bee stops on a flower, he usually rests his feet on the sides of this high nectar-fountain. But here are the traps, one small slit on each side of the fountain.

As the bee braces himself and drains the nectar from the flower, his feet gradually slip down into the little slits. When he has finished with the honey and is ready to take off, he finds that he is stuck in the traps.

Now down in these traps are the little bags of pollen that must be taken to other milkweed flowers if seeds are to be formed. The bee pulls and tugs to free himself. As he struggles, bags of pollen are apt to get caught on his feet. When he finally loosens his feet from the trap, he flies off, taking pollen with him. It usually drops into the next flower that he visits.



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Fifth of a Series on

PLANT ADVENTURERS

PLANT PIONEERS

by

MIRIAM WOOD

Raymond Foundation

Museum Stories, Number 214

March 31, 1951

Plant Pioneers

Pioneers! Perhaps that word makes you think of people like Columbus or Magellan or other famous men who have pushed on through strange and new places. A true pioneer makes the way for others.

Many plants are pioneers. They advance, not with ships or with horses or on foot, but quietly and slowly and in their own way. They take a foothold where no other plants or anything else can grow.

Lichens grow where few other plants can survive—on rocks, stone walls, roofs, and tree trunks. They are true pioneers. Just try to pull a lichen off a rock sometime and see how tightly it clings. It has become almost a part of the rock because the little root-like parts of the lichen have disintegrated the rock and forced their way into the crevices.

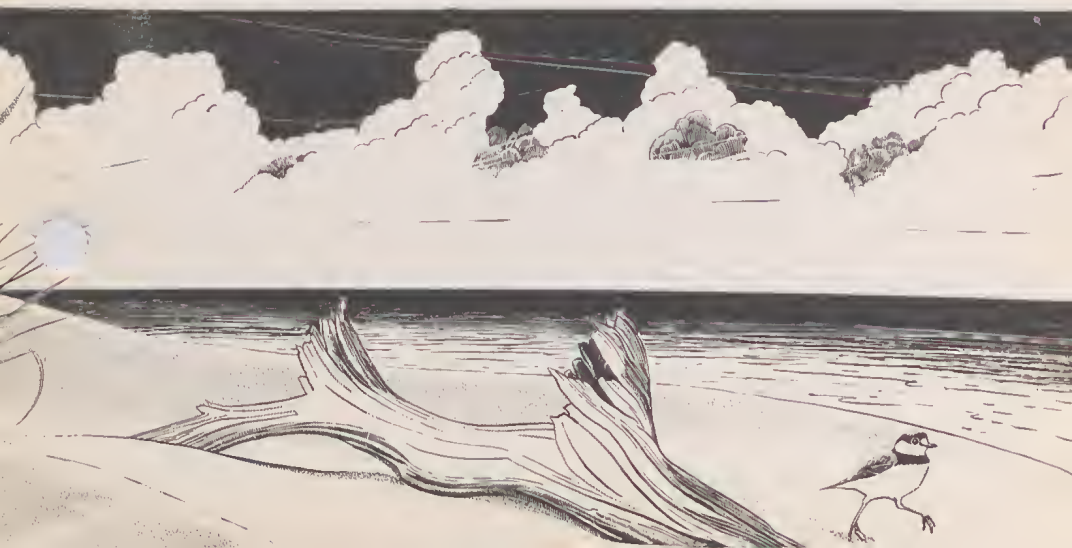
A lichen is a true pioneer in another way. It can go for months without water. Our earliest pioneers in history used to endure all kinds of hardships, but they could not live long without water. A lichen can manage to get water right out of the air or from a passing cloud full of tiny water droplets. Should it really snow or rain on the lichens, you can actually see them changing color as they absorb the water. The best place

to see this happen is in the mountains where the rocks are covered with these tiny plants. They may be of many different colors—green, gray, red, and black and all their combinations. But as the lichens dry out, the colors turn more grayish.

And so you might look at a mountain side one day and see that it is a gray or blackish color. Then after a rain storm you would see the mountain side suddenly change color. Some people think that the rocks are just washed clean in the rain, but it is the lichens soaking up the water and changing their colors.

In our sand dunes near Chicago you can find other plant pioneers, particularly the grasses that grow in the moving sands close to the lake. The next time that you are in the dunes or some such place where the sands are shifting and are not anchored down very well, look at the plants that manage to hang on and grow, even in moving sand.

These grasses have very long roots that run along under the sand, and every so often another grass plant shoots up from the same rootstock. By growing in this way, the grasses begin to hold the sand down a little, like tiny anchors, and make it more stable. Then it is possible for other plants such as poison ivy, wild grape, and low shrubs to grow in the sand.



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Sixth of a Series on

PLANT ADVENTURERS

PLANT DEFENDERS

by

MARIE SVOBODA

Raymond Foundation

Museum Stories, Number 215

April 7, 1951

Plant Defenders

Plants, like animals, wage constant warfare in order to survive. Battles are fought every day of the year against winds, heat, cold, and animal enemies. Plants war among themselves, too. The bitter struggle goes on continually but, because it is always a silent battle, very seldom are we aware of it.

Each plant has its own special way of getting enough sunshine and water, of scattering its seeds, of growing, and of protecting itself. And for every kind of plant enemy there is a plant defense. Thorns, stinging hairs, poisons, bad smells, and prickles are just a few of the defense weapons that plants use. The bad smells of certain plants like skunk cabbage drive off animal enemies. Thorns are effective protection for the hawthorn. The tip of each hawthorn branch bears a needle-sharp thorn and the base is armed with groups of needles. It is no wonder that cattle and horses avoid the hawthorn.

The burs of the cocklebur protect that plant from animal enemies. The sandbur is another plant of this kind. The vicious little spines of the sandbur can pierce the skin very easily and are very difficult to remove. The spines are sharp and tough enough even to puncture leather shoes. Around Chicago the sandbur is found mostly in the sand dunes near Lake Michigan. Sometimes the sandbur starts to grow in pastures and makes them almost worthless.

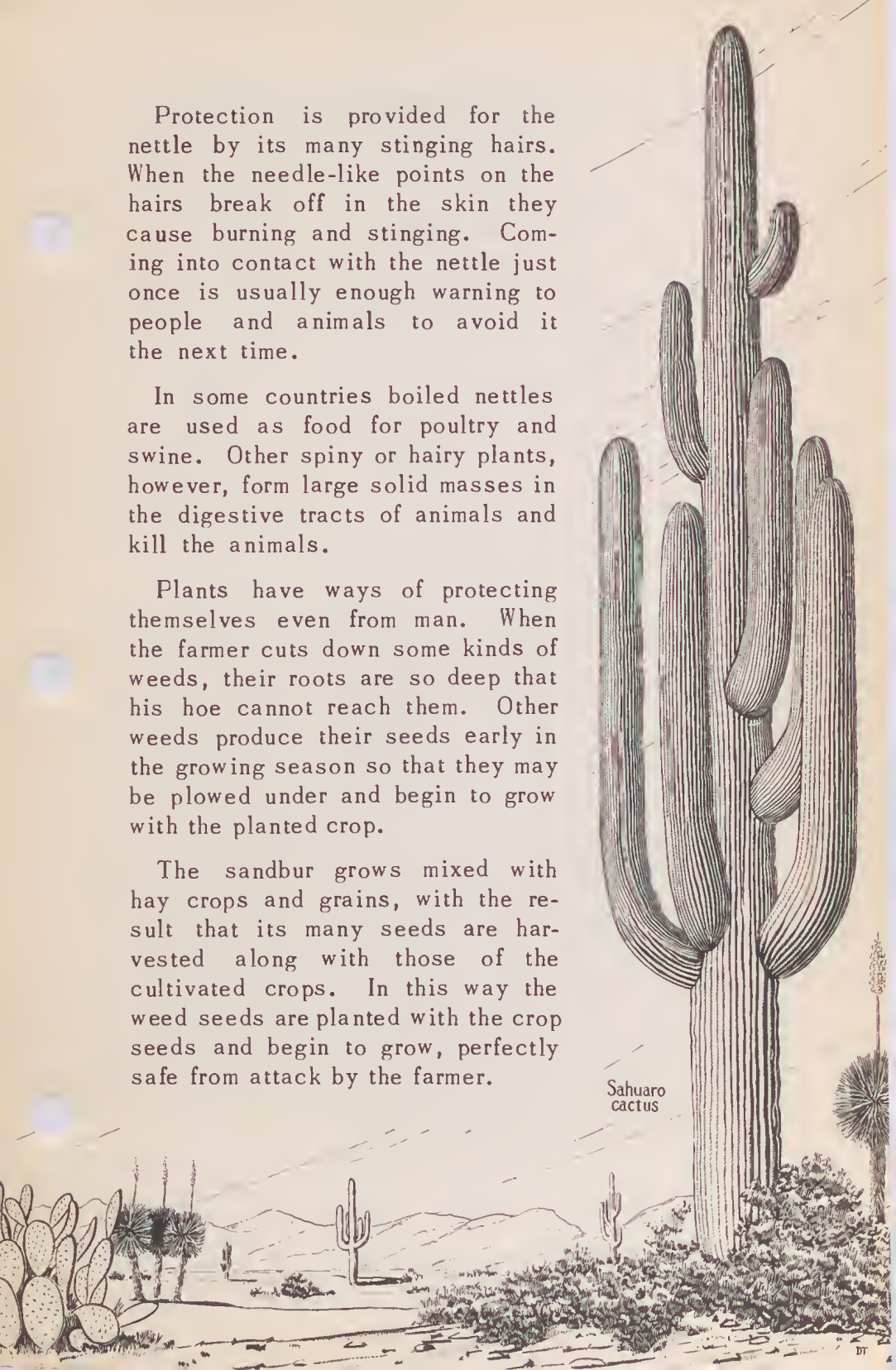
The distinctive habits of some plants protect them from natural forces. Those evergreens that grow where there are heavy snowfalls develop thick layers of wood on the undersides of their branches to support the branches against the weight of the snow. The cactus, which grows in hot dry places, can survive long dry periods because it has water-storage cavities in its stem. The cactus has no green leaves from which to lose water through evaporation.

Protection is provided for the nettle by its many stinging hairs. When the needle-like points on the hairs break off in the skin they cause burning and stinging. Coming into contact with the nettle just once is usually enough warning to people and animals to avoid it the next time.

In some countries boiled nettles are used as food for poultry and swine. Other spiny or hairy plants, however, form large solid masses in the digestive tracts of animals and kill the animals.

Plants have ways of protecting themselves even from man. When the farmer cuts down some kinds of weeds, their roots are so deep that his hoe cannot reach them. Other weeds produce their seeds early in the growing season so that they may be plowed under and begin to grow with the planted crop.

The sandbur grows mixed with hay crops and grains, with the result that its many seeds are harvested along with those of the cultivated crops. In this way the weed seeds are planted with the crop seeds and begin to grow, perfectly safe from attack by the farmer.


Sahuaro cactus

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Seventh of a Series on

PLANT ADVENTURERS

PLANT FIGHTERS

by

MIRIAM WOOD

Raymond Foundation

Museum Stories, Number 216

April 14, 1951

Plant Fighters

It may seem strange to you that a plant can be a fighter and that it might be a killer and that you could even call it a pirate. To be sure, a plant pirate cannot sail around in a ship on the Spanish Main like the pirates of old and rob and plunder and kill.

But a plant pirate today can sail through the air for miles. It can settle down on another plant and rob it of its food. And the plant pirate can kill its victim.

The commonest plant pirates are the fungi that grow on the trees in your yard. One kind is the shelf fungus. It is a harmless-looking little plant that sends its tiny root-like parts into the tree and drains the life of the tree. After a time you might find that the entire center of the tree is rotted out because the fungus pirate has stolen its life away.

This plant pirate has a way of sailing about, too. Its seed-like spores are as fine as powder. When they ripen, they drop out, and then they are picked up by the wind and blown around. They can sail for miles and, as the wind dies down, they drop to the ground or onto a plant or tree. If one alights on a tree where the bark has been torn away, it has a chance to grow into the tree and steal food.

Strangling fig

Not all fungi are robbers and pirates. Some fungi are useful, especially when they grow on dead plant-parts like old tree trunks. There the helpful fungus causes the dead material to rot and give back to the soil the much-needed food.

Some plants are pirates and killers only because they must have a place to live. A plant pirate like this is the Spanish moss that grows in the South on live-oak and cypress trees. It does not take food out of the tree but eventually it keeps a lot of light and sunshine away, and so it becomes a nuisance and a possible killer. Many other plants are killers because they take sunshine. The humid tropics are full of plants that grow on other plants, stealing their sunshine and finally killing them. A good example of that kind of plant pirate is the strangling fig. It grows around a tree trunk and soon covers it entirely. Almost all jungle plants push each other about as they try to get food and sunshine.

We have plant fighters in the city, too. Some of them are big and pushy. The cottonwood tree is one of them. The cottonwood tree will grow in a smoky, dusty region where most other plants and trees cannot grow. It will steal all the water from the ground, and its roots, as they seek more water and food, will grow into crevices and into the drainage pipes. They even will push up the sidewalks.

Probably the plant pirate that is closest to us and the one of which we are most aware is a fungus that often grows on our feet and causes the condition known as athlete's foot. This tiny plant is found in moist places. In the summertime especially we may pick up its very small seed-like spores on our feet at the beach or in other similar places. The spores start to grow on our feet and soon we feel an itching. If the fungus is not destroyed soon enough, there is real pain as the plant grows into our skin and steals life from us. This plant is really a vicious pirate.

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Eighth of a Series on

PLANT ADVENTURERS

PLANT ENEMIES

by

MARIE SVOBODA

Raymond Foundation

Museum Stories, Number 217

April 21, 1951

Plant Enemies

Every plant in the world has to protect itself if it is to survive. But some plants protect themselves so well that they are really enemies of man. A few of the harmful ones are poison ivy, poison sumac, Jimson weed or thorn apple, and ragweed.

Perhaps the best-known plant enemy is poison ivy. It is very common in the United States. It may grow like a small shrub or it may climb over trees, fences, and posts like a vine. It bears clusters of white flowers in the spring and white berries in the summer and fall. Its flowers and berries and three glossy green leaflets are its most easily recognizable parts. In the fall the leaflets turn brilliant shades of red and orange. The leaflets, stems, and twigs contain the irritating fluid that causes a red rash and blistering. All people are not affected in the same way by contact with poison ivy. Some may not even get the rash after handling the plant. Others may feel intense pain and itching after merely brushing against it. Oddly enough, poison ivy seems to have little effect on most animals.

Not so common as poison ivy but even more dangerous is poison sumac, a shrub that grows in bogs and swamps. Poison sumac may be from six to thirty feet high, but instead of bearing red berries, as do other sumacs, it bears white ones that are just like those of poison ivy. Its leaflets, like those of poison ivy, turn vivid shades of red and orange in the fall.

Probably the most destructive of all North American plants and the one most dreaded by cattle raisers is locoweed, a plant that grows in pasture lands of the western United States. The word "loco" is Spanish, meaning crazy. After animals have eaten locoweeds, they do all sorts of peculiar things. At first a loco animal staggers about in a dazed way. Later it gets very feeble, and eventually it dies as if from starva-

tion. Horses, cows, and sheep are affected by the plant, and once they have acquired a taste for it, they may refuse to eat anything else. Horses are unmanageable after they eat locoweeds.

Jimson weed or thorn apple is a low-growing shrub commonly found in dumping grounds and in many waste places. Although there is poison in every part of the plant, its showy white flowers develop into little thorny fruits that are very poisonous. Children, not knowing that they are playing with danger, like to pick the flowers and put them into their mouths because the flowers look so much like tiny trumpets.

Jimson weeds grow in several places in the world. Since early times people have used their poison in primitive magic. Medicine men of certain American Indian tribes ate the seeds at religious dances to bring on temporary insanity.

Hay-fever sufferers claim that ragweed is one of the worst plant enemies of man. It grows in back-yards and vacant lots and along highways, railroads, ditches, and rivers. It is responsible from late summer until frost for the misery of many people. Because they are sensitive to ragweed pollen, some of the victims suffer with nearly constant sneezing, running noses, and watery eyes until the hay-fever season is over.

Poison ivy

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Ninth of a Series on

PLANT ADVENTURERS

PLANT HEROES

by

MIRIAM WOOD

Raymond Foundation

Museum Stories, Number 218

April 28, 1951

Plant Heroes

A hero is a courageous person who has done brave deeds for other people. We admire heroes because they help us by their noble acts. We don't usually think of plants as heroes, and yet many plants help us by the way they grow or in the ways we can use them. Of course they cannot save us from drowning, but they can save our lives in other ways.

If you should be very sick with pneumonia, the doctor might give you penicillin to make you well. It comes from a tiny plant of the blue-mold group. You have probably seen mold growing on dry bread. The mold looks harmless and helpless there and seems to mean only that the bread is old. But a substance from this tiny mold, penicillium, when prepared with great care in laboratories and developed into a medicine, will be able to fight and kill the germs that make you sick and might even kill you.

Many other plants are used in medicine, and each one is a hero to us, especially when we are made well and comfortable by it. One of the most famous of these heroes is quinine, which comes from the bark of the cinchona tree. Quinine will relieve and cure malaria fever. Parts of other plants will ease your simple aches and pains. Camphor from the leaves, chips, and bark of camphor laurel trees will soothe your chapped lips and hands (although one of the biggest uses of camphor is to make celluloid). Warm olive oil poured gently into your ear may help an earache, and castor oil made from castor beans may stop a stomach-ache. Many vitamins come from plants, and they, too, help to keep us healthy and full of energy.

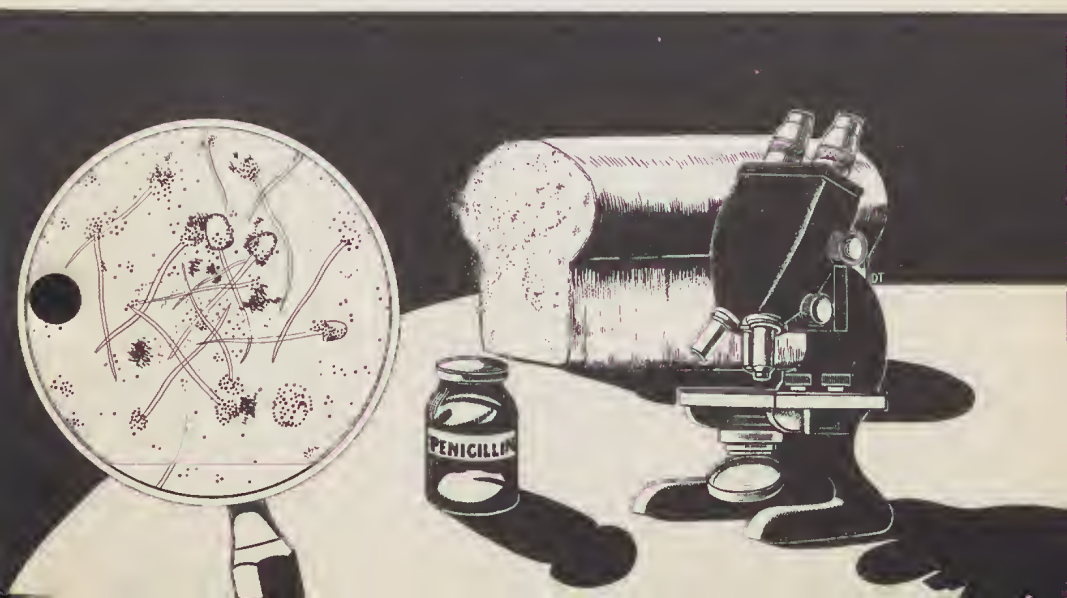
There are other reasons for calling plants heroes. Some plants grow on dry, hot deserts where very few plants can live. The cactus is a well-known desert hero. It holds the desert sands from shifting too much and, as it grows and dies, it deposits a little vegetable

matter so that eventually other plants may grow there. Dune grass does the same kind of heroic deeds in our sand dunes near Lake Michigan.

Peanuts, alfalfa, and clover are heroes because they can give needed nitrogen to the soil. This happens in a very complicated action in the tiny lumps (nitrogen-fixing nodules) on their roots. Then the soil is made richer, and important food plants such as corn, wheat, and oats can grow. Imagine peanuts doing all this, besides being good to eat!

Still other plants are heroes because they are so big and strong. The redwood trees of California are this kind of hero. They are the largest and the oldest of living things. Think of it! A giant redwood three hundred feet tall and three thousand years old! Forty bungalows, each of them with five rooms, could be built with the wood of one redwood tree.

In the lifetime of one of these still-living giants the Egyptians built the pyramids, Christ lived and died, Columbus discovered America, and the Pilgrims landed. Now airplanes fly over these same giant trees. Think of the stories these ancient giant redwoods could tell us! To be able to live all these years and grow so large is heroic in its way, too.



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